

### History of the various particulate standards

Until 1987 the primary particulate standards were for total suspended particulates (TSP), independent of particle size or chemical composition. The long-term standard was an annual geometric mean not to exceed 75 micrograms of particulates per cubic meter of air ( $\text{ug}/\text{m}^3$ ). The short-term standard was a 24-hour average of  $260 \text{ ug}/\text{m}^3$  not to be exceeded more than once per year.

In July of 1987 EPA published revised particulate standards to account for the deeper inhalability of small particles and eliminated the total suspended particulate standards. The new standards, rather than applying to TSP, apply to inhalable or fine particulates. A particle size of 10 micrometers was selected as the upper size limit with a 24-hour concentration of  $150 \text{ ug}/\text{m}^3$  and an annual standard of  $50 \text{ ug}/\text{m}^3$  expressed as an expected annual arithmetic mean (AAM). The short term standard is attained when the expected number of exceedances is no more than one per year. The expected AAM is determined by averaging the annual arithmetic averages from three successive years of data. In 1997 EPA proposed new fine particulate standards for those particles that are 2.5 microns or less. These proposals went into effect on September 16, 1997. In addition, a new interpretation of the PM10 standard went into effect on the same date. The new national primary and secondary ambient air quality standards for particulate are  $15.0 \text{ ug}/\text{m}^3$  annual arithmetic mean concentration and  $65 \text{ ug}/\text{m}^3$  24-hour average concentration measured in the ambient air as PM2.5 and  $50 \text{ ug}/\text{m}^3$  annual arithmetic mean concentration and  $150 \text{ ug}/\text{m}^3$  24-hour average concentration measured in the ambient air as PM10.

The secondary TSP standard was a 24-hour average of  $150 \text{ ug}/\text{m}^3$  not to be exceeded more than once per year, designed to protect from soiling, corrosion, etc.

When EPA adopted the fine particulate standards they eliminated the secondary TSP standards and made the secondary fine particulate standards equal to the primary fine particulate standards. In the recent proposals EPA is again proposing to use the primary standards as the secondary standards also.

As of the end of 1988 the State Standards for total suspended particulates still included an annual geometric mean of 60 micrograms per cubic meter and a 24-hour standard of 150 micrograms per cubic meter not to be exceeded. In addition, the Board of Environmental Protection adopted the Federal fine particulate (PM10) standards for both the short-term twenty-four hour and the annual arithmetic mean.

In 1989 the State Legislature passed a more restrictive annual standard for fine particulates (PM10) of  $40 \text{ ug}/\text{m}^3$ . In addition, the TSP annual State standard was eliminated and the 24 hour standard was changed to be an indicator of a nuisance condition.

In 1997, after conducting a major review of the particulate standards for the first time in ten years, EPA proposed new air quality standards for particulates less than 2.5

micrometers in diameter. The review took several years to complete and the decision was made to update the standards in order to “protect public health with an adequate margin of safety.” EPA determined through the review process that exposure to particles smaller than those that were currently being regulated were found to lodge deeply in the lungs and cause premature deaths and respiratory problems. In addition, the new standards will provide protection against the major particulate matter related welfare effects, including visibility impairment, soiling and materials damage.

The new standards consisted of revising the primary (health-based) PM standards by adding a new annual PM<sub>2.5</sub> standard set at 15 ug/m<sup>3</sup> and a new 24-hour PM<sub>2.5</sub> standard set at 65 ug/m<sup>3</sup> and changing the form of the standard. Compliance with the 24 hour standard is achieved when the three-year average of the 98 percentile for each year is less than or equal to 65 ug/m<sup>3</sup>. Compliance with the annual standard is achieved when the three-year average of the annual arithmetic means is less than or equal to 15 ug/m<sup>3</sup>. At the same time EPA retained the annual PM<sub>10</sub> standard of 50 ug/m<sup>3</sup> to protect against effects from both long- and short-term exposure to coarse fraction particles. The 24-hour standard of 150 ug/m<sup>3</sup> was retained but the form was changed. Compliance is achieved when the three-year average of the 99<sup>th</sup> percentile of PM<sub>10</sub> is less than or equal to 150 ug/m<sup>3</sup>. EPA also revised the secondary (welfare-based) PM<sub>10</sub> and PM<sub>2.5</sub> standards by making them identical to the primary standards.

In October, 2006 EPA finalized their latest review of the particulate standards and published several changes to the ambient air standards for particulates. EPA revised the level of the 24 hour PM<sub>2.5</sub> standard to 35 micrograms per cubic meter. The annual PM<sub>2.5</sub> standard was retained at the existing level of 15 micrograms per cubic meter. EPA also retained the existing 24 hour PM<sub>10</sub> standard of 150 micrograms per cubic meter but revoked the annual standard.